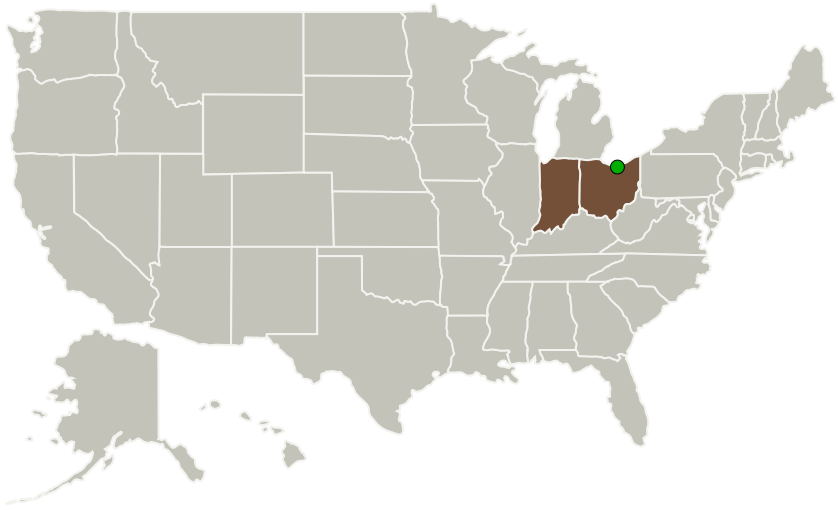
Simulation Environment for Power Management and Distribution Development, Phase I

Completed Technology Project (2012 - 2012)

Project Introduction

The overall objective of this research project is to investigate an autonomous and online control structure for finite-inertia power systems (dc and ac) with a real-time system simulation embedded within the control. The dual use aspect of this research will be demonstrated by focusing simultaneously on model development for both spacecraft power systems and terrestrial micro-grids. Both of these applications require advanced controls to react to unpredictable circumstances when human intervention is not possible or practical. The Phase I effort will focus on model development, model verification and validation, and applying model reduction and/or averaging and advanced simulation techniques to achieve a real-time system simulation. This will set the stage for the development of advanced power management and distribution controls. In particular, the possibility of embedding a real-time simulation into a control infrastructure, providing contingency analysis and look-ahead prediction of the results of control actions, could be investigated.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
PC Krause and Associates, Inc.	Lead Organization	Industry	West Lafayette, Indiana
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Indiana	Ohio

Project Transitions

February 2012: Project Start

August 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140291)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

PC Krause and Associates, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

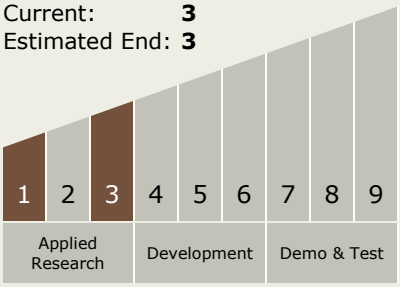
Carlos Torrez

Principal Investigator:

Benjamin Loop

Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.3 Power Management and Distribution
    - TX03.3.1 Management and Control

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System